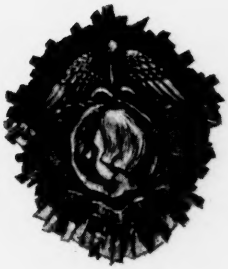
Journal of Dentistry for Children



THIRD QUARTER 1945

Journal of Dentistry for Children

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Vol. XII — THIRD QUARTER — 1945

CONTENTS

Teen Age Caries 57
Maury Massler, M.S., D.D.S.

President's Message 65

Matrices for Compound Amalgam Restorations 66
Harold Berk, D.D.S.

Communication 68

Secretary's Message 70

Around the Country 72
Stan Brown

Book Review 75
Robert L. Heinze

The Use of Medicated Cements in Dentistry 76
Leon Childers, A.B., D.D.S., F.A.C.D.

Questions and Answers 81

Unit News 84

TEEN-AGE CARIES

MAURY MASSLER, D.D.S., M.S.

Director of the Child Research Clinic
University of Illinois, College of Dentistry

INTRODUCTION

Dental caries has with some justification been called a disease of childhood. The present means of dealing with it is repair, but the definite trend in recent times toward understanding the basic problems in dental caries gives hope of instituting a program of prevention. Such a program, in order to be preventive, must begin with children.

It is well recognized that the problems of health and disease in children differ considerably from those in adults. Witness the specialties of pediatrics in medicine and pedodontics in dentistry for dealing directly with the problems of childhood. More recently it has been recognized that adolescents also have health problems peculiar to themselves. The pediatrician has assumed the responsibility for the medical problems of teen-age children, often neglected up to now. Dentists must also recognize that children of this age have special dental problems.

Is Teen-Age Caries a Fact?

Despite the fact that many thousands of teeth have been counted and many charts of decayed, missing and filled teeth have been evolved, the literature on teen-age caries is sparse. It has not often been considered whether there is a sharp rise in the incidence of caries or the rate of the carious process at this particular age.

Authors who have investigated the problem are in agreement that caries increases with age. Those who have examined the incidence of formation of *new cavities* for various age levels agree that the number of new cavities formed in the early teen age is unusually large (Brekhus and Armstrong, 1936; Kugelmass and Miller, 1937; Noyes, 1937; Moore, 1938; Cheyne and Drain, 1940; Deatherage 1938) (Figs. 1 and 2.) On the other hand, those

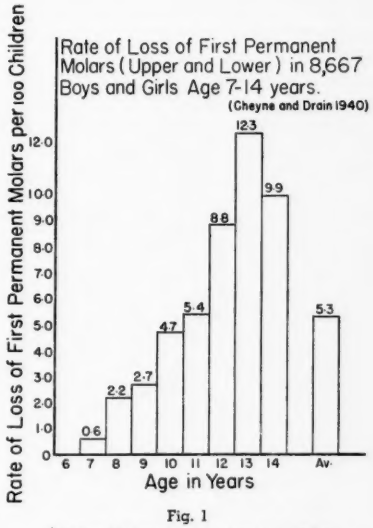


Fig. 1

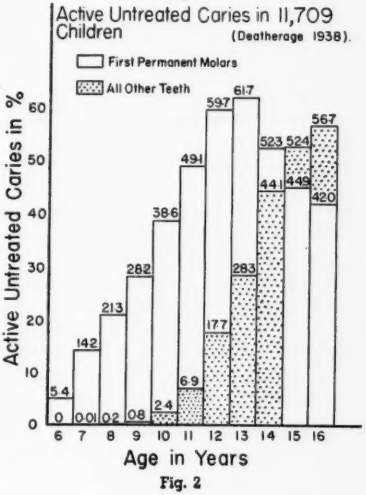


Fig. 2

who have examined the *number of teeth affected* or who have charted the DFM (decayed, filled and missing teeth) index for various ages have failed to report any unusual slope in their curves (Klein, 1941; Hollander and Dunning, 1939; Sloman, 1941). However, when available raw data of this latter group are reworked to show the *rate of increase* of the carious process, the fact is usually extracted that in the early teen ages there is a definite rise both in the *rate of information of new cavities* and in the *rate of caries progress* (Fig. 3).

Active Caries in 7,000 High-School Children 12 to 18 Years of Age. (Sloman and Sharp 1940)

	12	13	14	15	16	17	18	Mean
All Teeth	5.1	6.9	6.5	6.9	6.3	5.5	5.5	6.3
Molars	21.2	23.7	18.5	18.4	15.5	13.0	11.2	17.5
Anteriors	3.2	4.1	4.3	3.9	3.8	3.9	3.6	3.9

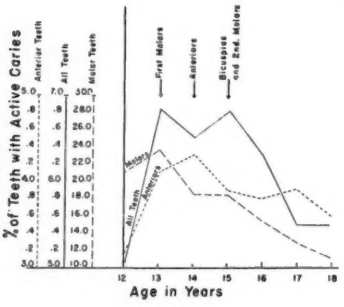
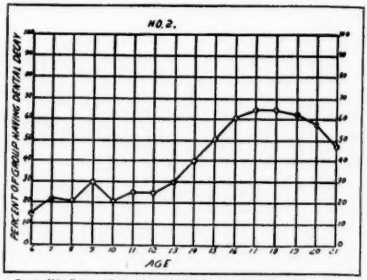


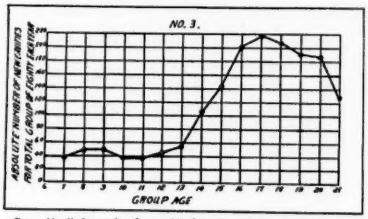
Fig. 3

To analyze this problem accurately, it is necessary to chart the caries experience of the same individuals from early childhood through maturity. The best data available in the literature were derived by Moore (1938) in a longitudinal study of 80 children from 6 to 21 years of age. Her studies show a sharp and definite rise in the formation of new caries during middle and late adolescence (13 to 18 years) (Fig. 4 and 5). If the caries experience of each child is charted separately, definite sharp peaks indicating exacerbations in caries activity occur between the ages of 13 and 20 (Fig. 6).

If the individual curves in the aforementioned study are combined, a smoothed curve is obtained which hides the individual peaks

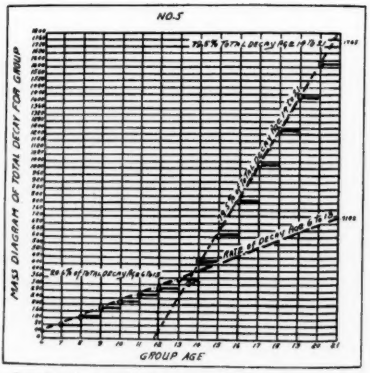


Graph IV—*Expresses the percentage incidence of new caries according to the age of the group of 80. Shows that at no time up to the 15 year period did we have 50% of the group of 80 with cavities.*



Graph V—*Absolute number of new cavities for total group of 80. Note the increase in numbers from 14 years to 21.*

Fig. 4



Graph VI—*Mass diagram of total decay for group showing 20.6% of total decay from 6-13. Also shows 79.5% of total decay from 14 to 21 years.*

We found 1035 cavities or 146% more decay between the ages 14–21 than would result if rate of decay from 6–13 had continued through to age of 21.

Fig. 5

and valleys (Fig. 7). It can therefore be seen that an average chart of the number of decayed, missing and filled teeth for various age groups is misleading, since the resultant curve is smoothed and obliterates the fact that in a given individual a sharp rise in the incidence of caries occur during the teen ages. A longtitudinal study in a given series of individuals is therefore to be preferred to a cross-sectional study of a larger group of individuals for the study of caries experience.

Since the repetition of a longitudinal study requiring about ten years was not feasible, it was felt that investigating the caries experience of young adults might yield pertinent information. Accordingly, 50 medical and dental students for whom full-mouth intra-oral roentgenographs were available, were asked to chart the exact age at which each filling had been placed in their mouths. One hundred and five (70%) of the students agreed that 76 per cent of their fillings had been placed between the ages of 12 and 20 years. Only ten per cent of the fillings had been placed after the age of 20 (Fig. 8). Six students still showed rapidly progressive caries, but the remainder gave evidence that the carious process had definitely slowed down or had ceased after 20 years of age.

Caries experience is also indicated by the answer to the question "At what age was the period of greatest decay?" Dr. Daniel Ziskin of Columbia University kindly supplied us with the answers to that question in

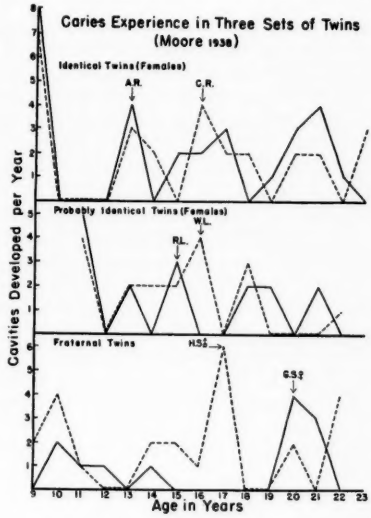


Fig. 6

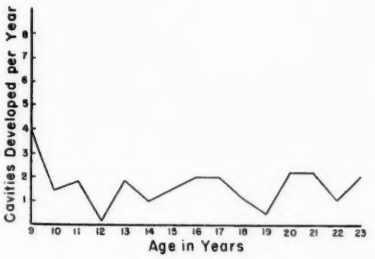


Fig. 7

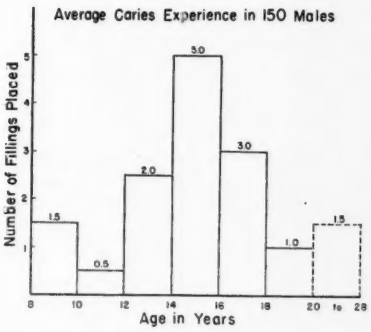


Fig. 8

1,000 unselected charts of patients from 8 to 60 years of age (Fig. 9). The data presented show that the period of greatest decay in this group occurred between 15 and 20 years of age. Fifty per cent of all these persons experienced their highest incidence of caries between 10 and 25 years of age.

More recently Burrill (1943), in a cross-sectional study of 3,478 patients, found that caries susceptibility was higher during the ages of 13 to 21 than before or after.

CONCLUSION 1: Both clinical experience and careful analysis of statistical data obtained from cross and longitudinal studies of *caries experience* indicate that a sharp and definite increase in the rate of caries progress occurs during the early teen ages.

Is Teen-Age Caries a Special Clinical Problem, and if so, How Does It Manifest Itself?

If teen-age caries represented only a moderate increase in carious activity, the dentist could cope with it by the usual means, prophylactic odontotomy, early instruction in oral hygiene and dental repair. The carious activity in the adolescent, however, may become rampant and spread very rapidly. The process may get out of control despite early and good restorative attention. Under such circumstances it is sometimes futile even to place permanent fillings, because recurrent decay reduces them to merely temporary measures. Many conscientious dental practitioners have been unjustly blamed under such circumstances. Marshall (1939) aptly described the problem: "Rampant caries occur and disappear without aid or hindrance from the physician or dentist."

Rampant caries may be defined as a suddenly appearing, widespread, rapidly burrowing type of caries resulting in early involvement of the pulp and affecting those teeth or dental surfaces usually regarded as immune to ordinary decay. The carious dentin is typically soft and necrotic in character.

The term odontoclasia has been used by Martha Jones to describe a form of rampant caries occurring only in the deciduous teeth. Miller and Walker extend the term to include rampant caries of the permanent teeth.

It is important to distinguish between true rampant caries and the extensive caries re-

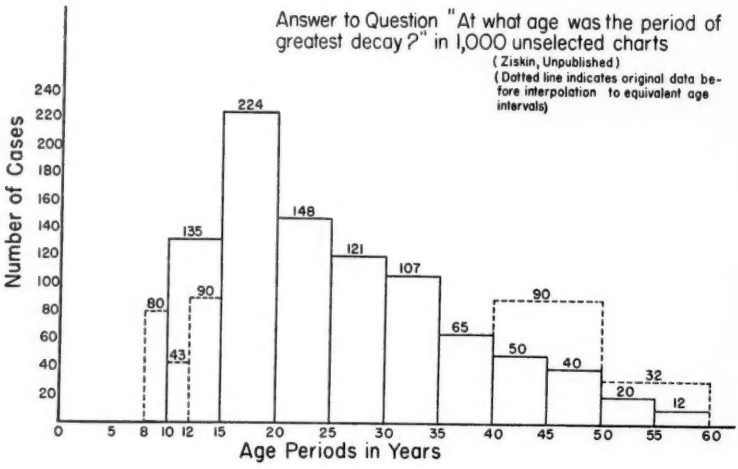


Fig. 9

sulting from neglect and filth, since the etiologic factors and therefore the methods of control are quite different. Rampant caries usually occurs in a relatively clean mouth and may be distinguished from the more common neglected caries by the absence of materia alba and food debris in the mouth. Rampant caries usually begins in the occlusal surfaces and the interproximal areas of the teeth, particularly the lower anterior ones. In neglected, filth caries gingival caries predominates, the process beginning on the labial surface of the anterior teeth and the buccal surface of the posterior teeth at the gingival level. It is characteristic of rampant caries that it cannot be halted by the ordinary methods (repair, improvement of oral hygiene, strict dietary regimen), whereas filth caries is amenable to oral hygiene and restorative procedures.

Reduction of fermentable carbohydrates in the diet plus good cooperation of the patient has not often been found adequate to control lem are in agreement that caries increase with the spread of rampant decay, since many adolescents suffering from rampant caries follow good dietary regimens before and during the carious process. When a *poor* diet is corrected, it often does succeed in decreasing the rate of caries progress, but in the teen-age child it seldom stops it. Reducing the carbohydrate intake has sometimes been effective in reducing the carious activity. More often, no effect could be observed. One must recognize that a rapidly growing organism like the adolescent must have an adequate supply of carbohydrates for growth energy in addition to energy for maintenance and activity. Too drastic a reduction in carbohydrates was never undertaken, since that may actually do harm.

CONCLUSION 2: Teen-age caries is a clinical problem, and when the process becomes rampant, the problem is serious and often insoluble.

What Is the Incidence of Rampant Caries?

To my knowledge, the incidence of rampant caries has not been determined. Clinical material from the dental school is too highly specialized and cannot supply the answer. The latter must be obtained from dental studies of school children during a general measure of caries incidence in normal children. Until such studies are made available for analysis, I can only offer a personal impression that rampant caries is more frequent than one is wont to believe, perhaps even more frequent than enamel hypoplasia.

CONCLUSION 3: The incidence of rampant caries is unknown.

Does Rampant Caries Have a Particular Age Incidence?

During the course of this study, 24 cases of rampant caries encountered in the Research and Educational Hospital of the University of Illinois were thoroughly investigated and 11 additional cases were referred from the clinics of the dental school by Dr. Hatch and Dr. Gerlach. Thirty-five cases represent a sizable group but the number is insufficient to provide definite conclusions.

However, it is interesting to note the age distribution of these cases. In 23 cases, the patients were between 11 and 16 years of age. Twelve cases were between 5 and 8. Every pedodontist believes that most cases of rampant caries occur in children between 5 and 8 years of age, probably because his practice is restricted to children under 13. Kugelmass and Miller (1937) reported a high incidence of carious activity for the two age groups, 6 to 8 and 12 to 14 years.

CONCLUSION 4: Rampant caries seems to have a predilection for the early teen ages. It also occurs often in children between 5 and 8 years of age and may, under unusual circumstances, occur during other age periods.

Is the Increase in Teen-Age Caries Coincident with Any Constitutional Changes?

A careful history of both growth and caries experience was obtained in 35 cases of rampant teen-age caries. A definite correlation was found to exist between the circumpuberal spurt in growth and the sudden appearance of rampant caries (coefficient of correlation =

0.82). In addition, if a spurt in growth occurred early (10 to 12 years), the caries also appeared early (11 or 12 years). If the spurt in growth was delayed until the age of 15 or 16, the spurt in the carious process was also delayed to about 15 or 16. Kugelmass and Miller (1937) have already noted this fact and have related the increase in caries activity to the spurts in growth that occur at the ages of 6 to 8 and 12 to 14.

> (A growth history can be obtained from the records of previous examinations of the child or from school records obtained in his physical-training courses. When these are not available, a history from the child or the parents as to height and weight changes during the previous year or two usually suffices. When this, too, fails to give the needed information, changes in shoe size, clothes size, etc., will usually give sufficient information.)

CONCLUSION 5: The sudden appearance of teen-age caries seems to be coincident with the circumpuberal spurt in growth.

Does Rampant Caries Have a Higher Incidence in a Particular Type of Individual?

The importance of considering constitution and bodily habits in relation to disease is indicated by the vast literature which has recently been accumulated on the subject of constitutional or body types. It is striking to note that in 85 per cent of our 35 cases, the children who experienced rampant caries were definitely, or even extremely, ectomorphic (tall and very thin). In only three cases were the children definitely endomorphic (short and stocky). In one case, the child was mesomorphic (muscular, with a strong physique), but his caries was undoubtedly due to or aggravated by extremely poor oral hygiene (filth caries). The caries was characteristically gingival and circular, and much materia alba was present, in contrast to the clean mouths in all other cases.

Broderick (1939) has noted a correlation between the incidence of caries and physique. Hurme's work correlating caries with height and ethnic origin is strongly suggestive of the same conclusion and analysis of his data will undoubtedly offer a more substantial basis for it (personal communication).

CONCLUSION 6: Rampant caries tends to have a high incidence in ectomorphic (linear) persons. It is apparent that in such persons the caries progress cannot be explained by local factors only and undoubtedly has some constitutional basis.

DISCUSSION

By What Mechanism Is Caries Increased in the Early Teen Ages?

Since caries is a bacterial infection of the dental hard tissues, any factor influencing its rate must act on these organisms directly or indirectly through the intra-oral environment. A qualitative and quantitative change in the saliva is the easiest way to alter the oral milieu systemically. It seems reasonable to expect that any systemic condition operating to affect the rate of the carious process does so by a concomitant alteration of the saliva. What these changes may be or how they are produced is quite unknown.

It has been proposed that since the most obvious and profound changes occurring in the teen-age child operate through the endocrine system, that they might also influence dental caries. However, endocrine changes are themselves only a small part of the total changing constitution of the teen-age child and do not alone form a solution of the problem of the increase in carious activity.

It has also been proposed that the dietary habits might be a causative factor in the production of teen-age caries. If this is so, much remains to be elucidated, for the majority of children in our thirty-five cases of rampant caries was following excellent dietary regimens, both at home and at school.

It has also been proposed that improved oral hygiene was the solution to this problem, but neither clinical experience nor actual analysis bears out this thesis, since many of the children with rampant caries were found to practice very good oral hygiene.

In short, teen-age caries is a constitutional problem as yet unsolved.

What Constitutional Changes Occur During the Early Teen Ages?

The early teen-ages constitute a period of

rebirth, and it is necessary to review only a few of the constitutional changes that charterize this period to appreciate its importance.

SOMATIC CHANGES. The school child grows in a relatively slow and simple manner until puberty and then experiences a sudden spurt in growth. He loses his childhood fat and his roundness and acquires the leanness characteristic of adolescence.

METABOLIC AND ENDOCRINE CHANGES. The effects of the gonadal hormones on the internal environment result in the production of those secondary sex characteristics which appear at puberty (growth of pubic and auxillary hair, genital and mammary development, vocal changes, etc.). It is well established that extensive changes in metabolism accompany these somatic changes in body configuration. For example, the intake of carbohydrate must be increased to supply additional energy for growth. Iodine metabolism is known to increase so markedly at this time that a relative iodine deficiency often occurs in girls during menarche. The so-called "adolescent pimples" reflect similar changes in the internal environment and metabolism of the child.

We have often seen distinct clinical evidence of vitamin A deficiency in the rapidly growing teen-age child in the form of (1) dry scaly skin; (2) perifollicular hyperkeratosis in areas of pressure; (3) vascularization of the cornea of the eyes and increased adaptation time to darkness; (4) Bitot spots (conjunctival xerosis); (5) diminished salivary secretions with epithelial plugs at the openings of the salivary-gland ducts, and (6 areas of hyperkeratosis on the gingival and oral mucous membranes. It is well known that the lysozyme content of the tears is diminished during vitamin A deficiency. It was not possible to determine whether the lysozyme content of the saliva was similarly decreased. Such investigations would be of great value toward solving the problem of teen-age caries.

PSYCHIC CHANGES. The psyche also changes at this age, with wide-spread effects on both the internal and the external environment of the child. He is apt to be a "lone wolf" who frequently resents parental supervision and may even reject his parents. He tends to segregate himself with others of his kind; to subsist largely on hot dogs, pop and candy, and to be impatient with his home environment. Potentially serious defects in his dietary habits are kept within reasonable limits by the recently introduced policy of selling lunches in elementary and high schools and informing teachers about nutrition.

EMOTIONAL CHANGES. The teen-child is emotionally unstable because of the profound changes in his internal and external structure. The effects of emotional upsets and "nervous tension" upon the dental apparatus have been infrequently investigated. In our experience, we have often seen rampant caries or dental erosion following a period of emotional stress in medical students after comprehensive examination periods and in tense, middle-aged males after incidents which have caused them prolonged emotional trauma. In such cases, a complete breakdown of the entire dental apparatus either through rampant caries or through erosion may occur within a six-month period. The mechanism of this effect is undoubtedly through the altered composition of the saliva. The changes in the saliva after emotional upsets (fear, etc.) are well known to every dentist. It is therefore not far-fetched to speculate upon the relation of this factor in the production of teen-age caries.

The teen age is a neglected age. The child earns no income and is dependent on his parents for sustenance, even though he is independent in mind. When to this is added the fact that until recent years no particular branch of medicine concerned itself with the problems of the adolescent, the situation arises whereby children of an extremely traumatic age receive little supervision from either physicians or parents.

It has been common practice in the past to refer children under 13 to a pediatrician and children over 13 to an adult clinic. The teen-age child is not happy in either situation. Fortunately, the pediatrician has recently become active in recognizing the problems peculiar to adolescents and has assumed the burden of their care. There is every reason to hope that some day there will be clinics for teen-age children alone.

Meanwhile, to the array of diseases peculiar to the teen-age child—anemia, the menarche in the female, anorexia, psychic and emotional upsets, dermatologic problems, etc.—must now be added teen-age caries.

The condition of the teeth in the adult depends to a great extent upon the care given to them during adolescence (Friend, 1943). The neglect of teen-age caries exacts a penalty far more severe than at any subsequent age. Early and very frequent dental examinations and treatment — every three months rather than every six months—*must* be practiced. Even a few months' neglect may lead to pulpal involvements (Friend, 1943). The large number of rejections because of dental defects in the early phases of World War II was undoubtedly the result of *neglected teen-age caries.*

SUMMARY AND CONCLUSIONS

1. A distinct increase in the rate of new carious formations occurs in the early teen ages and decreases markedly thereafter during progress toward maturity.
2. Teen-age caries is a clinical problem. The caries may even become rampant. Then it becomes a serious clinical problem.
3. The incidence of rampant caries is unknown.
4. Rampant caries occurs most frequently during the early teen ages and is peculiarly a disease of this age group. This does not imply that other age groups are immune, but that the incidence is highest during the teen ages.
5. The spurt in teen-age caries seems to coincide with the spurt in linear growth that characterizes the early teen age.
6. Rampant caries is associated far more frequently with the ectomorphic (slender) type than with other body types.
7. Teen-age caries is broadly a constitutional problem rather than simply an endocrine, nutritional or dental problem.
8. The mechanism whereby teen-age caries is produced is unknown.

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The President's Message

Several matters have been disposed of or discussed by your President and Council during the past several months, and I would like to offer the following for your consideration:

1. The dental health program which has been proposed for the United States by a joint committee of the Council on Dental Health, the Committee on Legislation and the Committee on Economics of the American Dental Association is based on: (1) Dental Research, (2) Dental Health Education, (3) Dental Care, *particularly for children.*

The A.S.D.C. has already made a noteworthy contribution to this program. The list of essential operative services for children which our society submitted to the Council on Dental Health was adopted by the Council's Sub-Committee on Low Income Programs. This list of services was also agreeable to the dental consultants and representatives of the Children's Bureau at a recent conference in Washington. This group added orthodontic treatment to the list of necessary services.

The successful outcome of the American Dental Association's program will, in a large measure, depend upon the dentists' willingness to accept their responsibility of providing more and better dental service for children. *Dr. Jack M. Wisan* has suggested that our society begin a "dynamic program with the objective of pointing out to the dental profession its responsibility to provide good dental service to the children of the United States."

Discussing the matter with *Drs. Gruebbel* and *Morrey* recently, I found them to be in complete agreement with us, and willing to aid in any of our endeavors, and in turn, our society will be asked to help in their programs. While final plans have not been made, it is likely that component units will be asked to actively participate. Any suggestions which any member may have and would care to submit, would be appreciated.

2. The 1941 report of the College Committee, "Dentistry for Children — Its Nomenclature," was sent to the Nomenclature Committee of the American Dental Association on July 19, 1943, for approval or rejection. A letter just received from the Chairman of this Committee informed me that we can expect a report from the committee in the near future.

3. The editor of our *Journal* has been voted an honorarium of $100.00 per year. In reality this is not an honorarium but an expense account, as this sum is to include all expenses, except stationery, which are incurred by the editor in discharging the duties of his office.

4. The *Journal of Dentistry for Children* is the only publication in dental literature dealing solely with dentistry for children. Started by *Dr. Samuel D. Harris* as a mimeographed sheet, the *Journal* is today a 28-page and cover quarterly publication, produced at an annual cost of approximately $900.00. In line with the Society's policy for *Journal* improvement the editor has made arrangements with the *Pycope Company* and the *Columbia Dentoform Corporation* whereby they will advertise their products in our *Journal.* Other advertising accounts are being considered.

If sufficient funds were accumulated for the *Journal* through the sale of advertising space, by subsidies, or both, articles submitted for publication in the *Journal* could be illustrated. This valuable addition to an already good magazine would, I am sure, induce more men to contribute articles for publication and would definitely increase reader interest. This is the goal toward which the editor and his staff are working.

R. L. I.

Matrices for Compound Amalgam Restorations

HAROLD BERK, D.D.S.
Boston, Mass.

Editor's Note:
Harold Berk is an alumnus of Northwestern University Dental School. He has been associated with Forsyth Dental Infirmary since graduation, and is President of our Massachusetts Unit. Although this is the first paper of his we have printed, Doctor Berk has had several articles published in the Journal of the A.D.A., and we are looking forward to his continued presence on our pages. *A. E. S.*

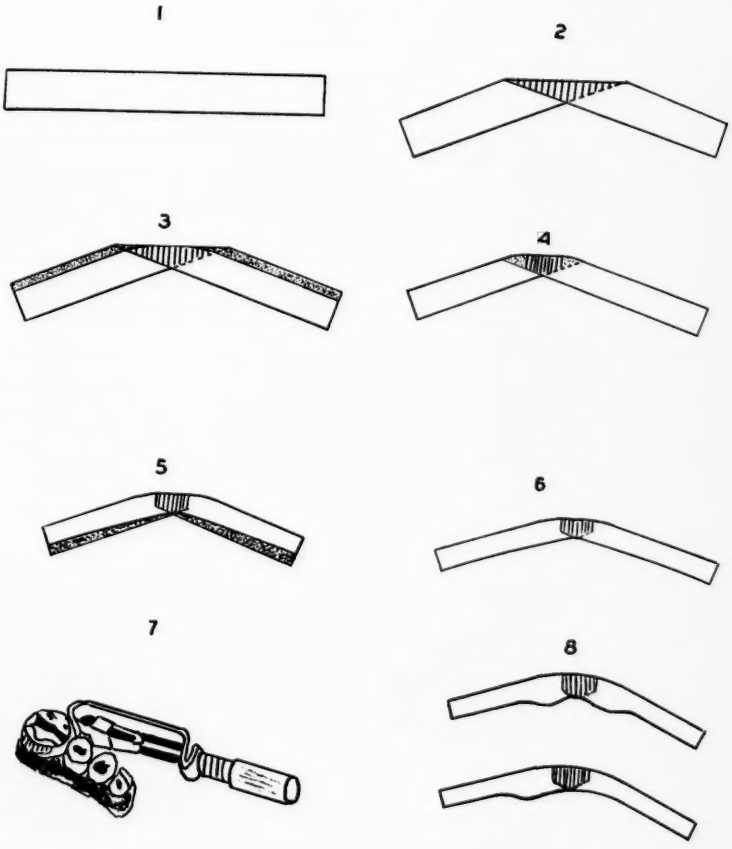
A successful amalgam restoration is dependent primarily on four factors; namely, contour, contact, marginal adaptation, and condensation. Amalgam being a plastic mass when introduced into the tooth, necessitates the use of a matrix in order to fulfill these essential requirements. It is not the purpose of this paper to discuss the various types of matrices in use today, but rather to demonstrate a matrix which will aid in creating better amalgam restorations.

The matrix to be described assures proper contour, adequate contact, ideal margins, and sufficient rigidity so that the amalgam can be condensed with great pressure. Following is the technique of its construction.

A piece of 0.002 stainless steel matrix band material which is 5/16 inch wide and of the desired length is twisted at approximately a 45° angle (Fig. 2), and pressed together tightly with cotton pliers. This results in a double thickness of metal at the fold (shaded area, Fig. 2). The fold should be no longer than the mesio-distal width of the lingual surface of the tooth. This is accomplished by trimming away approximately one millimeter of the upper border from either end to a point inside the fold (speckled area, Fig. 3). This results in two loose ends in the folded area (speckled area, Fig. 4). These ends are cut off. The width of the band must be trimmed to fit the matrix holder. Therefore trim along the gingival border (speckled area, Fig. 5). This results in a curved piece of metal (Fig. 6). When placed into a matrix holder the occlusal border (the side having the fold) is greater in circumference than the gingival border. This allows for the proper adaptation of the band to the gingival constriction of the tooth. The band is next placed about the tooth so that the folded area rests on the lingual surface (Fig. 7).

By means of a burnisher proper contour is readily established. A toothpick wedge placed interproximally produces sufficient separation for adequate contact. The difference in occlusal-gingival circumference assures marginal adaptation. The double thickness of metal at the fold strengthens the matrix and enables it to withstand the great pressure necessary for thorough condensation.

It is apparent, therefore, that this matrix band aids in satisfying the four fundamental requirements for successful amalgam restorations. It takes but a few minutes to prepare and can be used in the Ivory No. 8 or No. 9 matrix holder or in any similar appliance. The width of the band is suitable for the average tooth and can be easily modified for the unusual cases (Fig. 8). If greater occlusal-gingival height is necessary, a 7/16 inch band can be used.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COMMUNICATION

Editor's Note:
We are presenting herewith the latest comments from the facile pen of Jim Taub anent the Dental Hygienist plan.
Our pages are open to reasonable comments or criticisms from any dentist, hygienist, dental student, or member of an allied profession. We invite your correspondence. *A.E.S.*

June 3, 1945.

To the Editor:

May I ask your indulgence in publishing this letter in the *Journal,* since you have so kindly published Dr. J. O. McCall's reply to my criticisms of his article, each of which appeared in successive issues?

I am indeed sorry that I have been unable to convince Dr. McCall of the serious shortcomings of his proposals, but if I am to some small degree successful in keeping alert the "loyal opposition", my efforts will have been worthwhile.

Dr. McCall's is a voice of authority, especially in dentistry for children. Because he is of such stature, it is essential for the profession to become more vociferous in opposing his plan, which would tend to break down the dental profession into insignificant units.

Other voices have taken up the cry and say that we must train auxiliary personnel for children's dentistry, because, they say, even if governmental funds are made available to provide this free dental service to children, dental personnel will not be available.

Regarding dental personnel, I have no doubt that all the prominent current statistics indicating a post-war shortage of dentists in the U. S. A., for all the *potentially needed dental services* are accurate, however I do not believe there will be any actual shortage of dentists for the amount of dental service which will *actually be sought* by the public.

There are millions in the armed forces now receiving compulsory dental treatment, who upon returning to independent civilian life, will only seek dental treatment in emergencies. As for the present civilian population, which is now overworking the dental profession, they will most assuredly dwindle to normal proportions when our military dentists are back in private practice and when once again automobiles, radios, refrigerators, new homes and furnishings are in the market to absorb all their cash.

The oft-repeated fallacy, that dentists are not inclined to accept employment in public health services, is repeated over and over, until it would almost seem a reality.

However the originators of many plans for dental clinics in public health facilities, forget that among other essentials in their plans, a dentist is entitled to a salary commensurate with the amount of effort, time and expense consumed in qualifying for his license to practice and in gaining experience. Usually the salaries proposed for dentists in such work are so low, that most competent men are not interested and those who do accept, have no incentive to perform, nor any desire to remain.

Assuredly there are many dentists who enjoy their work, but basically are not shrewd business men and intensely dislike the contradictory economics of a private dental practice. Just offer a fair salary range, with fixed periodic increments, with permanent tenure and a suitable retirement plan and there will be keen competition among dentists for such positions and an incentive to give their best to that job.

However, if you propose an average $3,000 salary for a gruelling, if not altogether impossible, operating schedule, as appeared re-

cently in a mass-production plan which was highly publicized and incidentally, endorsed by Dr. McCall, not much success may be expected. Fortunately Dr. McCall's plea for approval of that plan was denied by organized dentistry.

Dr. McCall stated in his reply to my criticism of his revolutionary proposals, that I agree with him in all but the economics of the plan. I am very sorry if I expressed myself so poorly that it could appear my only concern was over a possible decreased income in private practice.

No; my criticism was directed more against the lowering of dental standards, training, competence and prestige.

With all its shortcomings, dentistry in the U. S. A. leads the world and whether or not the School Dental Nurse in New Zealand or even the witch-doctor in New Guinea, are permitted to perform operative dentistry, I am opposed to our falling down to any other people's levels.

In my comment previously published, I challenged all of the reasons advanced by Dr. McCall to justify his proposals for extending the fields of dental hygienists and dental technicians into operative work. I said that it would be basically unsound to train operators for any part of dental practice without their first receiving complete training and licensure as dentists. I observed that it would be the beginning of a dangerous, "snow-balling" movement, which once granted birth by the dental profession would continually seek to expand the fields of its activities and lower dental standards. I showed that Dr. McCall himself had best demonstrated this expansive nature by increasing the age limit of children to be treated by these super-hygienists, from 14 to 18 years of age, within one year during which he was proposing the plan.

To all of these criticisms Dr. McCall was silent.

Innocuous as this one phase, of having hygienists perform some operative dentistry for children, may appear, one must not overlook the fact that this is just one part of Dr. McCall's comprehensive plan for producing 2-year "ersatz" dentists, for many phases of dental practice.

Either the present concept of a broad, ever-expanding dental education and training for dentistry, followed by accepted licensure procedures, is wrong, or, Dr. McCall's premise that you can train competent workers in almost any one phase of dental practice, in two years, is a false one, whatever the excuse of the moment may be.

Personally I favor the accepted standards for educating future dentists and even favor increasing the scope of that training, to produce better dentists.

I fully agree with Dr. McCall that children of parents who cannot afford to pay for competent private dental services, should be provided good, free dental services, just as the children whose parents cannot afford to send them to private schools are entitled to good, free public schools.

However, in both public schools and private schools alike, the minimum basic qualifying requirements for teaching personnel are the same; only fully trained college graduates, licensed as teachers, are acceptable.

Dr. McCall's analogy contradicts itself by providing inferior, "ersatz" dental operators in the free clinics he proposes for children, in contrast to licensed, fully qualified dentists in private practice.

Whether such free clinics for pedodontics are provided by federal, state or local funds or by private philanthropies, is not my concern, but I would strongly insist that the dental operating personnel therein, be fully qualified dentists and strictly of no "ersatz" variety. Such clinics too, could broaden the now narrow field for internships for graduate dentists, on a decent subsistence salary and operating under the guidance of experienced dentists.

In all fairness it should be acknowledged here, that our dental hygienists, through their Association, have officially and emphatically disclaimed any connection with, or desire for Dr. McCalls' auxiliary personnel proposals.

Is it incorrect to assume that because a dental authority like Dr. McCall, expresses the belief that with two years training, people could become fully competent in performing the greater part of dental services now rendered by dentists only, that our profession can rapidly fall to low levels in the public estima-

tion? Perhaps one significant reaction in that direction was the very recent insult tendered the dental profession when the mayor of New York City granted the dentists employed in public school clinics, *a 50 cent daily salary increase, in recognition of the increased cost of living!*

The "article" from which Dr. McCall quoted me as saying "We must plan and take action", unfortunately was not an article I had planned to write, but was a letter to the editor of the *Journal,* which happened to appear in the same issue as my discussion of Dr. McCall's plan. I do hope to write that article in the near future, explaining a definite plan for forcing dentists to either provide good dentistry for juvenile patients or refer them to someone who will. The concluding phase of that plan is one for the public relations bureaus of the A.D.A. and A.S.D.C. to carry out.

I wonder if Dr. McCall would continue to consider it hopeless for any action by the A.D.A. to change the prevailing attitude of the profession toward children, if the A.D.A. and the A.S.D.C. too, would consent to publicly "call a spade a spade"?

Rather than the official silence of A.D.A. serving as a protective cloak for the guilty members of dentistry, and their untruths and makeshifts commonly used to discourage public interest and demand for pedodontics, we could shame and coerce dentists into accepting their obligations, by expressing these untruths and evasions to the glaring light of official truths, repeated over and over again, conspicuously.

If all the noble editorials of the past three years, deploring dentistry's neglect of pedodontics, were put into easily understood language for the layman and issued frequently as press and radio releases for public consumption, wouldn't public opinion, so enlightened, react upon the guilty members of our profession, toward more favorable behavior regarding dentistry for children?

In conclusion, I sincerely wish I were capable of convincing Dr. McCall that there is something wrong with his plan.

Yours truly,

W. JAMES TAUB
609 Western Avenue
Albany, N. Y.

Secretary's Message

In compliance with my Secretarial duties I have removed from our rolls those members who as of this date have continued delinquent in the payment of their 1945 dues. It was indeed gratifying that nationwide I have had to drop only 56 members.

I wish at this time to express my appreciation to all the officers of the various State Units and especially to the Secretaries for their indispensable help in solicitation and collection of dues within the Units. Under the restrained schedule of operation of the Society these duties are the greatest of this office along with trying to keep track of members in the Armed Forces as they are moved around as well as civilian practitioners who move without advising me of their changed address.

The New York Unit deserves special comment, having enrolled 111 members, and losing only 1. The Southern California Unit has become rejuvenated and has enlarged its membership in addition to having again become organized and active. The Minnesota, Missouri, and Pennsylvania Units should receive special commendation for having renewed their Unit memberships 100%, losing none of their 1944 members through delinquency of dues. These accomplishments represent many hours of work on the part of the officers of the various units, and due credit should be given to them.

With best wishes to the membership for a pleasant summer, I am

Respectfully yours,

DR. R. M. ERWIN, *Secretary*

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AROUND THE COUNTRY—

Our "Hollywood Assistant," *Dr. Frank C. Cady,* has returned from foreign service in U.N.R.R.A. Most of his time was spent in England and France. *Dr. George Nevitt* and *Frank* have exchanged positions. *Dr. Cady's* new address is U.S.P.H.S. District No. 1, U. S. Sub-Treasury Building, 15 Pine Street, New York 5, New York. *Dr. Cady* will assume the presidency of the American Association of Public Health Dentists at the next annual meeting.

The School of Dentistry, College of Physicians and Surgeons, San Francisco, is sponsoring two courses in children's dentistry under the direction of our own *Charlie Sweet* of Oakland. Dates—June 18-23 and October 1-6.

The Wisconsin State Board of Health, State University, and State Department of Public Instruction have drafted a cooperative program under which it is hoped to promote improved health education for the school children of the State from kindergarten through the twelfth grade.

The Michigan State Dental Society, with the Bureau of Public Health Dentistry, Michigan Department of Health, and the Graduate School of the University of Michigan is sponsoring the presentation of continuing education programs for the component district societies in the State.

Unfortunately there is no specific course on Dentistry for Children. However, *Dr. Donald Kerr* will present a timely subject related to children—"What is Fad and what is Fact regarding the role played by Calcium Metabolism and Vitamins in Dentistry."

Two of *Walter McBride's* former students are now engaged in the exclusive practice of dentistry for children. One had been in general practice six years and after nine months of "exclusive" practice reports that he is happy, enthused as a "school boy," pleased with the work and with the fine income he is making. (His income now far exceeds any previous period in general practice.) The second chap has been engaged in children's clinic work for five years and counselled with your column editor as to the practicability of opening an exclusive children's practice. Nuff said—he is now practicing "dentistry for children, only."

It seems a splendid tribute to *Walter's* influence and teaching that these two boys now "see the light of day." What an opportunity for young men to establish a lasting practice in the field of children's dentistry! Old man depression *can* be just around the corner for us older ducks who are grabbing off the adult prosthetic services, but the men in children's work will never have a depression!

Our friend *Ken Gibson* of the Children's Fund of Michigan has done some fine thinking and writing on the personnel problem in dentistry. To be even more practical, *"Dr. and Mrs. Kenneth R. Gibson* of Birmingham announce the birth of a son, *Richard John,* on April 29." Congratulations!

Bill J. Harris, from Hanover, New Hampshire, is now stationed at the National Naval Medical Center, Bethesda, Maryland. Let *Bill* tell you. "Just now I am about as far removed from children's dentistry as any dentist could ever be. I am here at the Center in a maxillofacial prosthesis group finding ourselves restoring lost fingers, hands, toes, ears, and acrylic eyes that are really masterpieces."

Lieutenant Eugene B. Byrd of Baltimore, formerly associated with the Guggenheim Dental Clinic in New York City and serving as assistant regimental dental surgeon with the 94th Engineers, recently participated in a conference of U. S. Army dental surgeons, the first of its kind held in the European Theatre of Operations. (6th Army Group,

Germany). Dentists from all types of medical installations met at the 21st. General Hospital for two days of discussion of latest developments in maxillo-facial and plastic surgery, denture construction and similar professional subjects. From all sectors of the Western Front they came by jeep, rail, plane and truck. (*Eugene* is a member of the New York unit, A.S.D.C.)

Your reporter did a little "roving" on his own. *Dr. and Mrs. Theunissen* from Mt. Pleasant, *the writer and his wife,* spent a few days in London, Ontario. Cold, rainy weather, but warm Canadian hospitality made the weather a poor topic of conversation.

From *Sec. Taub* of the N. Y. chapter we learn—Paid up membership 111, plus 5 inactive in the armed forces, as compared with 55 members for 1944. *Captain Mortimer D. Solomon* sent his application and check from the vicinity of Egypt, where he is serving with the A.A.F., and *Lt. Herbert Deutscher* responded likewise from his post in the Philippines. That is what we call fine support!

Dr. David B. Ast, Director of Oral Hygiene, New York State Dept. of Health, promises some good news relative to a vast program of dentistry for pre-school and grade school children in all rural areas of New York.

Dr. Henry M. Wilbur, beginning July 1, will be Assistant Professor in the School of Dentistry at the University of Louisville with primary responsibility of teaching Pedodontics. *Dr. Wilbur* has been associated with the University of Nebraska, College of Medicine. Says he, "I am looking forward with a great deal of interest and enthusiasm to this new position."

The New Jersey Society of Dentistry for Children, cooperating with the Monmouth County Dental Society and the Bureau of Dental Health of the New Jersey State Department of Health, held its Annual Meeting at the Marine Grill, Asbury Park, May 26, 1945.

The following program was presented. Table Clinic Children's Dentistry, *Dr. Harold Berk,* Assistant Chief, Dental Clinic, Forsyth Dental Infirmary, Boston, Massachusetts. Dinner—Chicken or Turkey—$2.25 per plate. Discussion—How Can Schools and Volunteer Health Organization Improve Dental Health of Children. Motion Pictures—General Anesthesia and Techniques for Children's Dentistry, *Dr. Walter J. Pelton,* Dental Surgeon, U. S. Public Health Service.

A suggested plan for a National dental care program comes from the American Association of Public Health Dentists. In brief —"The American Dental Association, the American Public Health Association, the U. S. Public Health Service, the U. S. Children's Bureau have all subscribed to the principle that dental care should be available to all, regardless of income or geographic location. Plans should be made to provide tax-supported dental service for all children in a given area who cannot obtain adequate care from the local dentists because of parents' inability to pay or because of dentists' inability or unwillingness to devote enough of their time to meet the dental health needs for all children in the community. Indigents should pay no fees, the medically indigent should pay small fees when possible, and other children should pay the customary fees charged in the community." Where local dentists could not provide these services, "Dental Services could be provided by clinics, trailers, public health centers, hospitals and schools. Dentists would be especially trained in children's dentistry, employed by the State health department on a yearly salary basis and their work would be inspected by dentists from the same agency."

Chicago—At a meeting of the Public and Professional Relations Committee of the Chicago Dental Society March 8, a motion was carried approving the establishment of a program of dental health education in the Chicago school system and authorizing the Committee on Dental Health Education to develop such a program.

Saskatchewan, Canada. (Health Plan Committee) "The present tendency seems to be toward having all dental services provided by salaried officials, where the establishment of clinics is possible. Even the provision of

services to children of a limited age group must be a gradual development and we can be assured of a certain amount of private practice for many years to come, so the individual dentist will have a choice of systems under which he will operate.

"Failing the establishment of any extensive provincial scheme it will be necessary to take some steps to attract the dentists to outlying districts, where suitable accommodation is difficult to obtain. Mobile units on wheels could be used only on a limited scale in this province, owing to weather conditions at certain seasons, but isolated districts could be served reasonably well throughout the year with portable equipment.

"Development, in order to be sound, must be gradual and while professional inertia is to be deplored, we must not allow ourselves to be stampeded by outbursts of political enthusiasm on the part of ill-informed persons. On the other hand, if we are not prepared to take the lead, we may have to submit to being led. If we are to preserve autonomy in the administration of our own affairs, we must prove that we are capable." The Saskatchewan report is but another of world-wide reports relative to the dental problem. Eventually they all come to the conclusion that dentistry for children is the most logical beginning but none of them knows what to do about the adult needs.

Dr. W. R. Davis, President A.A.P.H. Dentists writes: "Some dentists have said they think dental service for school children should be compulsory. That, I think, would be a mistake. It would not be possible with present dental manpower, and in any case it would create undesirable opposition because the American people do not like compulsion. When readily available, I am satisfied the great majority of elementary school children would accept. Teachers then would have more interest in promoting dental health." (Bulletin, AAPHD 5-45).

Congratulations to *Jim Gasaway,* of our Editorial Board, who was recently elected honorary member of the Nu Nu Chapter of Omicron Kappa Upsilon, at the University of Detroit School of Dentistry.

Louis Braun, prominent Detroit orthodontist and member of our Michigan unit is President-elect of the Detroit District Dental Society.

Come July 1st, *Phil Blackerby,* formerly Dean of the School of Dentistry at Louisville, will assume his new duties as Director of the Dental Division of the Kellogg Foundation at Battle Creek, Michigan.

Two prominent members of our Ohio unit, Clevelanders *E. Carl Miller* and *C. Frank Tuma,* are appearing in Michigan this year on educational and clinic programs. *Carl* will lecture and demonstrate to several dental groups throughout the State on amalgam work, sponsored by three Michigan dental groups, while *Frank* will appear on the program of Detroit's Fifth Annual Dental Review, in October, 1945. (*Stan Brown* will also appear on Detroit's Review, speaking on his favorite topic of Economics and the Successful Profitable Practice of Pedodontics. *A.E.S.*)

The Pierre Fauchard Academy Poll (*Dental Survey, April*—1945) of America's practicing dentists upon their own practice of dentistry for children. Results: "Children are good dental patients and they make up an important part of the average dentist's practice, but working with children apparently is not as remunerative as taking care of the oral troubles of their elders. Most dentists are interested in working with children and have definite ideas on what should be done to insure the oral health of American's youngest generation. A large majority of them believe that something needs to be done to provide that insurance. Eighty-eight percent of the dentists stated they do at least some work for children and these dentists gave answers which showed that the average amount of children's work is 22% per dentist. 75% favor a national plan of dental care for children, but there is no very definite trend of thinking among dentists on the form or method of operation of any such plan.

"Dentists, however, favor keeping any organized program for dental care under the control of the profession and most of them show a distrust of the advisability of allowing more than a very slight intrusion into its management by representatives of public agencies.

"Dentists are in substantial agreement about the present, however closely they may be divided on the future: 86% of them told the P.F.A. Poll panel that they believe children are not being adequately cared for under our present type of dental practice: 12% think children are presently receiving adequate care; 2% have no opinion."

Comments: Lack of remuneration for children's services might indicate a definite need for economic and office management knowledge. Apparently the old unit service fee still prevails in too many offices. The hourly service fee is so simple to establish in children's work that actually the net remuneration should be greater than the old unit fee for the elders.

I can highly recommend and endorse the book "Juvenile Dentistry," by *Walter McBride,* for the sound and practical treatment of economics. Every dentist can follow the economic hourly fee plan and make dentistry for children the most profitable department of his practice. Geographic barriers are removed in the hourly fee plan, and if an area can support a dentist at all it can pay a most remunerative fee for children's services.

The basic element of this column should be news of the A.S.D.C. members and unit activities. Please take a minute, a postcard, pen or pencil, and help us keep this department interesting. I'll appreciate your cooperation!

Stan Brown,
Ithaca, Michigan

BOOK REVIEW

The Classification and Treatment of Injuries to the Teeth of Children

The Classification and Treatment of injuries to the Teeth of Children, by E. G. Ellis, Professor of Operative Dentistry and Director of the Dental Clinic, Faculty of Dentistry, University of Toronto, Published by The Year Book Publishers, Inc., 304 South Dearborn Street, Chicago, Ill.

This book deals with one of the most tragic conditions which confronts the general practitioner during the day's work and with in creasing frequency. Since the dentist is embarrassed by the emergency of fractured or traumatized anterior teeth of the young patient, he is possibly perplexed as to the best procedure to follow.

Dr. Ellis has graphically divided these cases into ten well described classifications with appropriate emergency, immediate treatment, followed by suggestions for temporary or permanent restoration. He explains in detail the technic for pulp capping and the indications and technic for pulpotomy.

An interesting chapter of thirty pages is devoted to the traumatized tooth which becomes non-vital, with or without loss of crown structure. In cases of extensive crown fracture numerous methods of restoration are described including the use of acrylic resins utilizing the shoulderless cap and the gold-acrylic crown.

The displacement of a tooth without fracture of the crown or root is considered from the standpoint of partial displacement with extreme mobility, extrusion, intrusion, total or complete displacement and complications of each.

In dealing with teeth lost by trauma, designs for restorations and space maintainers according to average age are presented in admirable fashion.

The book is profusely illustrated with photographs and diagrams and is highly recommended as a reference in every dental office.

Robert Leslie Heinze

The Use of Medicated Cements in the Practice of Dentistry

LEON CHILDERS, AB., D.D.S., F.A.C.D.
Lexington, Kentucky

Editor's Note:
Leon Childers is at present working toward his M.P.H. degree at the University of Michigan, after having completed 10 years in private practice in Lexington, Kentucky, and two years in the U.S. Public Health Service. He received his A.B. degree from Transylvania College in 1925, and his D.D.S. from the University of Louisville, College of Dentistry in 1931. He is a Fellow of the American College of Dentists, a member of Omicron Kappa Upsilon, and Psi Omega. We are pleased to present him to you through the medium of the accompanying article, and trust there will be more from him in the future. A.E.S.

For centuries man sought the magic transmutation of metals into gold. Alchemy, it was called. For over one hundred years more dentists have searched for the equally magic substance or material which could be used to repair permanently the defective tooth. The alchemist, and his successor the scientist, failed in the gold-making project—and it appears that the quest of the dentist has been only slightly more successful.

Cements, possessing certain germicidal qualities, were introduced early as the solution to the filling material problem and these so-called "germicidal" cements have been used more or less extensively by the profession for more than fifty years. The purpose of this paper is to present a composite review of the significant studies made of the germicidal cements, with an appraisal of the more important findings to see if the practitioner of dentistry can arrive at some conclusion based upon scientific evidence, regarding the proper place of these materials in his practice. The "profit-motive" research of the manufacturers, plus the general gullibility of the profession to the salesman's authoritative routine, has resulted in the rather promiscuous use of this class of cements. The net effect has been a lot of poor dentistry, due in large measure to the false security engendered by persuasive marketing technics.

At about the time dentistry began to be profession-conscious,—a little more than a century ago—cements were developed as a new type of filling material. Paffenbarger reports that the first formula for dental cement was published by Ostermann in 1832.[1] Finely powdered lime and anhydrous phosphorous acid composed this first cement.

Then Sorel, a French chemist, while looking for a stucco material in 1855, discovered zinc oxychlorid cement and finding it unsuitable for his purpose, gave it to dentistry. This slow-setting and somewhat sloppy cement was used extensively for twenty-five years when, in 1879 Pierce produced a more desirable cement which set much more rapidly. This was the first zinc phosphate cement. That same year a lime and alumina silicate cement was introduced by Thomas Fletcher. The wide and rapid acceptance of this enamel-like material brought rather unfortunate results. When later the limitations of this silicate as a filling material became apparent, all cements were regarded with suspicion by the dentists, resulting in a sharp decline in their use.

Fifty years after Ostermann presented the first dental cement, W. V-B. Ames introduced the first of the copper cements, black copper phosphate cement, in 1892.[2] Certain bactericidal properties were claimed for this new cement and soon other proportions of copper were incorporated within the cement powder to increase this magic antiseptic

value. Varying amounts of copper, ranging from 2 to 25 per cent, were added to make the more widely used commercial product. A white cuprous iodide and greenish blue cuprous silicate have been marketed but with little success.

Then the compounds of two other metals were introduced, silver and mercury; but they have never been accepted generally as have the copper cements. The silver compounds are white silver chloride and yellow silver phosphate. Mercur-ammonium chloride and phenyl-mercuric nitrate are the two white complex mercury salts developed, but little used.

As indicated previously, the scanty records of the early contributions made in the field of medicated cements, are so cluttered up with commercial claims and cabalistic practices that it is difficult to estimate the true value of any of the work. The "research" pretty much resolved itself to the problem of finding out the sales value of the product and establishing more extravagant claims for it than the latest "creation" of the closest competitor. Consequently there was much confusion about the use of this class of cements and little real understanding of their antiseptic value. Not until 1915 was any scientific attempt made to clear up the rather deplorable situation. In that year two important scientific studies were published—one by Paul Poetschke and the other by M. L. Smirnow.

Poetschke dealt mainly with the chemical aspects of the problem and determined the differences in the germicidal efficiency of the various chemical combinations of the powder and liquid mixtures.[3, 4] His investigation was a "test tube" experiment however, in which tests were made of the germicidal properties of several different cements by adding both powders and "set pellets," (which were ground up before testing) to saliva previously obtained from various individuals. Bottled samples, with controls, then were incubated at 37°C for 24 hours. At the end of that time samples were removed from the bottles and various dilutions plated in standard infusion agar. Further incubation in the agar for forty-eight hours followed, with rather amazing results. The germicidal efficiency of most of these copper cements ranged from 96 to 100 per cent, which meant practical sterilization. Thus his conclusions were that cuprous oxide, cupric oxide and zinc oxide have marked germicidal qualities.

Smirnow took issue with Poetschke however, in an article which appeared three months later. His chief criticisms were (1) "that the conditions under which tests were made were not the same as when the material was subjected to actual use in the mouth and (2) that the dilution and plating method in determining germicidal action was a serious error." Then he followed with the caustic comment that "if 99% to 100% germicidal efficiency can be obtained from 5 to 15 minute exposures to these copper cements, as reported by Poetschke, then all coal-tar products and other chemicals better look to their laurels as germicidal agents!"

Smirnow wanted to determine the antiseptic qualities of both the liquid and powder of each cement before testing the pellets. Thus he set up experiments to test the antiseptic qualities of the mixing fluids, the cement powders, the antiseptic action of the mixed cement before setting, and finally the pellets after setting had taken place. He concluded that there were grades of germicidal efficiency in the various cements and that black and red copper oxide cements were the most efficacious of the group with the lighter colored copper cements and the ordinary phosphate cements following in that order. Smirnow was convinced further that the germicidal efficiency of all these cements depended to a large extent, upon the mixing liquid or "some readily soluble substance." It is interesting to note however, the admission that the germicidal action of cements in actual use depends on factors other than those demonstrated in the laboratory experiment—for example, porosity, and the properties of expansion and contraction.

The next research of any consequence on this subject was published in 1925 by C. Jane Fraser of the Dental Research Department of the University of Toronto.[6] Her objective was "to determine (a) if certain of the dental cements and fillings on the market were germicidal; and (b) if any of these ce-

ments or fillings would permit bacteria to pass through or around them." She examined the permeability as well as the germicidal quality of five varieties of copper cements, two silver cements and one zinc oxychloride cement. The results of Fraser's experiments were interesting in that she showed all the cements to be germicidal in character, when mixed and plated promptly after setting; but she found that upon repeated transfers of the pellets to other plates, none retained any inhibiting power except one, a silver cement. The germicidal quality was attributed to the excess of acid necessary in the mixing process—and the significance of this fact, she asserts, is that in an imperfectly sterilized cavity, the cements will be effective in destroying the remaining organisms. But if infection gains access later either through or around the margins of the cement, the inhibitory action will be nil.

For a test of permeability of these materials a rather interesting technic was devised. Small glass ampules were formed with constricted necks: in the bottom of the ampules was placed plain broth. After sterilizing, the open tops were filled with cement—the inside surface of the lip of the ampule being etched to assure good retention. The ampules were then immersed in a large flask of broth in which different types of bacteria were planted and from day to day, as any culture media in the ampules appeared opaque, those particular ampules were removed and smears were made to determine if the organisms were the same as those in the surrounding medium.

Conclusions advanced: the red and black copper cements were very impermeable, since no bacteria penetrated through or around these cements to the broth inside the ampule. The permeability table shows however that the white copper cements and the silver cements were not so effective, allowing organisms to penetrate to the broth.

In 1927 there was published an important study on cements by Crowell, which dealt principally with the physical chemistry of cements and stressed the importance of proper mixing technics.[7] Many of the apparent shortcomings of the cement filling could be overcome if the mixing procedure were fully understood and carefully carried out. Crowell also gave considerable attention to the factor of pulp irritation and reported that copper cements can be used in deep cavities without any danger of injury to the pulp. It had long been a subject of discussion as to whether or not the phosphoric acid actually damaged the pulp tissue, so Crowell attempted to answer this question and carried on experiments to determine (1) the acidity of the cement mass itself after setting for various periods of time; (2) the acidity produced by the cement in its environment (no washing or circulation); (3) the acidity of the environment when washing does take place.

The details of these experiments are too long to include here, suffice to give his general conclusions. 1. "Under all conditions zinc cements are less acid than either copper or silicate cement." 2. "Copper and silicate cements are closely similar in acidity." 3. "The acidity of even the most acid cement is small, no cement producing a permanent acidity in its environment greatly in excess of 1 part in 100,000." Crowell goes on to say that in a cavity extending into the dentin, either sterilization *or* a germicidial filling material such as copper cement, may be used and no pulp disease will result. But if the cavity is *not sterilized* and a *non-germicidal filling* is used, the remaining infection will likely cause irritation and eventual pulp death.

Thus Crowell was led to think that pulp irritation was due, not to any cement acidity, but to infection and perhaps trauma, resulting from too much pressure on the thin pulpal wall at the time of the insertion of the filling.

The next research of importance in this field was contributed by Hill and Boester, of Western Reserve University.[8] Their work on the relative efficiency of germicidal cements was published in 1934. Pellets of set cement were pulverized and placed in standard broth which had been inoculated with a 24-hour culture of staphlococcus aureus. The percentage of cement in broth necessary to be germicidal and the amount necessary to be bacteriostatic were then calculated. Several commercial cements were used in this experiment, and in addition, a base cement powder to which was added very finely ground phenyl-

mercuric nitrate crystals, but these crystals resulted in no significant changes, so far as germicidal efficiency was concerned.

Then tests were made to determine the germicidal value of the various cement powders not mixed with phosphoric acid. Results showed that the addition of phosphoric acid brought about a change in the germicidal value of the powders. Two of the copper cement powders were *more* potent while the potency of the others was *reduced.*

Hill and Boester confirmed previous research regarding the value of the copper cements as germicidal agents in the prepared tooth cavity, but they made a further observation which is important to note here i.e., the practical efficiency of these cements depends upon their solubility as well as their bactericidal value. In other words the actual germicidal property of set cements depends upon the formation of soluble metallic salt, which must penetrate into the dentin tubuli of the tooth. This penetrating action cannot take place unless the agent carrying the salt is soluble. Thus it becomes apparent that in order to have germicidal quality, the factor of "permanence" must be sacrificed.

The latest significant research on medicated cements comes from England. In a series of three articles Manley takes strong exception to the proponents of the "no-irritation" theory on the part of the dental cements.

His first article appeared in 1936 and was the result of an animal experiment.[9] Photomicrographs of the pulp reaction under copper cements showed destruction of the odontoblast layer. He declared that the dentinal fibrils are destroyed under cements in much the same manner as bacteria are destroyed and proclaimed a pulp reaction of great severity to the whole family of cements, those containing copper compounds being the worst offenders.

In a second article published in 1940 by Manley, the preparation of ground sections of dog's teeth, which had previously been filled with copper cement, sustained his findings of four years before, i.e., complete and early destruction of the odontoblasts with deposition of a mass of hyaline secondary dentine.[10]

Comes now the third report by Manley in 1942 dealing with the nature and degree of reaction of the human pulp of various filling materials.[11] This time, the results of previous experiments on dog's teeth, were confirmed by the investigation on human teeth. The odontoblasts were destroyed under copper cement, (in deep cavities and the blood vessels were dilated and hyperemic. Thus again the conclusion is, that the copper cements do produce a most serious and destructive action (in a deep cavity) well into the pulp chamber.

To sum up briefly, the more significant data culled from the reviewed studies manifest complete agreement among the investinite value with regard to germicidal efficiency. Some cements, to which have been added silver and mercury compounds also appear to possess this bactericidal property. All cements, including ordinary zinc phosphate, demonstrate inhibitory bacterial action in the plastic stage. All studies seem to indicate too, that there are grades of germicidal efficiency, depending principally upon the amount of copper added to the powder or liquid.

There is, however, difference of opinion as to the specific agent or chemical reaction in the mixed cement which gives it this particular property. Some attribute this phenomenon to the acidity of the liquid (or the phosphoric acid) used in the mixing procedure. Others claim that the copper compounds added to the powder or liquid is the factor which accounts for either the bacteriostatic or bactericidal quality of the cements. Again, later researches disclose that this antiseptic quality depends upon the solubility of the cement, as well as the copper content.

There is marked disagreement as to the pulpal reaction to these cements. Many investigators maintained that these materials could be used in deep cavities with complete tolerance by the pulp, while the most recent research sharply disputes this contention and demonstrates histologically, a severe reaction of the pulp.

All of which leaves one in pretty much of a quandary regarding the real values of this class of cements. To put it succinctly, the cements must be of poor quality as a filling material in order to have any antiseptic value, i.e., without solubility there is no antisepsis. Together with new histological evidence of pulp damage it is difficult to convince one's self wherein the medicated cements, as dentists now know them, have any place in dentistry.

It would probably be difficult to shake the faith of the large proportion of general practitioners who long ago became imbued with the "tooth-saving" qualities of the whole family of copper cements, but if Manley's work can be substantiated, dentists have been deceived too long by the patter of the well-trained "sales representatives."

It is interesting to note too, that some of our recognized pedodontists particularly have advocated the use of these copper cements as filling materials for primary teeth for the reasons that these teeth are lost anyway, it matters little if the cavity is hardly dry, since moisture is necessary to the solubility of the substance.

Such reasoning hardly can be called valid. Moreover when one considers that the pulp chambers of the primary teeth are larger in comparison to the size of the crown than the pulp chambers of the permanent teeth, one at once concludes that relatively there is more danger in the use of these cements in primary teeth than in the permanent dentition. Instead of extending the period of service of a primary tooth, its loss may be hastened. But such may be regarded as empirical reasoning, since this particular phase of the problem has not been submitted to sufficient scientific investigation.

Thus the early work in this field was no better than that of the alchemist, and later studies have been far too inadequate. Since this class of cements has become used so widely, and much of the research has been so conflicting, it behooves further research to determine definitely their value. Until then, final judgment must be withheld, but it appears at present that little or no justification can be made for the continued use of "medicated" cements.

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QUESTIONS AND ANSWERS*

1. Q. Does the diet of the mother affect the the calcification of the teeth of the fetus?

   A. "In utero calcification normally takes place homogeneously and completely. It is not markedly influenced by fluctations in the conduct of the mother, except perhaps in cases of grave maternal illness."

   R. Kronfold, Rudolf, Calcification and decalcification of the human teeth. N.Y.J. DEN., 9:232-5, June, 1939. (p. 233).

2. Q. Does pregnancy cause caries? (A tooth for every child?)

   A. "There is no appreciable change in the teeth of women during pregnancy or the first few weeks of lactation other than that which would probably occur in a similar group of non-pregnant women during the same period of time."

   R. Mull, J. W., Bill, A. H., and Kinney, F. M. Studies in serum calcium and phosphorus on pregnant women. Am. J. Obst. and Gynec., 27:689-83, May, 1934. (p. 683).

3. Q. Why should a pregnant woman go to the dentist regularly?

   A. "Routine search for the elimination of foci of infection in the teeth and tonsils should be a regular part of prenatal care if patients are to receive the attention due them.

   "Failure to remove such foci leads to a greater incidence of pyelitis and abortion and a smaller but definite increase in toxemia.

   "Removal of these foci of infection during pregnancy does not increase the risk of abortion over that normally found."

   R. Paul, T. D. and Galloway, C. E. Focal infections in pregnancy. Am. J. Obst. and Gynec., 39:691-7, Apr., 1940. (p. 696) etc.

4. Q. Is is safe to extract teeth during pregnancy?

   A. "For some reason there is still a tendency among some dentists to hesitate to remove defective teeth because of the fear of causing miscarriage or premature labor. That this is a fallacy has been proved at the prenatal clinic at the San Francisco hospital, where we have a very careful prenatal dental program. Our dentists have found that extractions and treatments of all kinds can be carried out without danger to pregnancy.

   "The only time we hesitate to make extraction for abscesses is when the patient is within a week or two of labor."

   R. Schaupp, K. L. Dental care of the prenatal patient. Calif. S. Dent. A.J., 17:143-4, Sept.-Oct., 1941. (p. 144) D. C. A.

5. Q. Should fillings be inserted during the period of pregnancy?

   A. "Our dentists have found that extractions and treatments of all kinds can be carried on without danger to the pregnancy."

   R. Schaupp, K. L. Dental care of the prenatal patient. J Calif. Dent. A., 17:143-5, Sept.-Oct., 1941 (p. 144) J.A.

6. Q. Does the health of the mother's mouth have any relationship to the safe delivery of the child and the early recovery of the mother?

*West Virginia Dental Journal

A. "It is very difficult to demonstrate any benefit from a preventive procedure such as the removal of various foci of infection but since adopting the procedure of requiring full-mouth x-ray films and examinations of the teeth and tonsils, I have had fewer cases of pyelitis, mastitis and toxemia."

R. Paul, T. D., and Galloway, C. E. Focal infections in pregnancy. Am. J. Obst. and Gynec., 39:694-7, Apr. 1940. (p. 694) J.A.

7. Q. Will a general anesthesia given to a pregnant woman affect her or the child? Local anesthesia?

A. "In the past six years at the prenatal clinic at San Francisco Hospital, our dentists have made 5,371 examinations and have made 3,300 extractions. In none of these cases, all of which had an anesthesia, local or general, was there any accident, miscarriage, or any other untoward incident. This eliminates any cause for fear that such procedures may have a bad effect upon the course of the pregnancy."

R. Schaupp, K. L. Dental care of the prenatal patient. J. Calif. Dent. A., 17:143-5, Sept.-Oct., 1941. (p. 144) J.A.

8. Q. Are the primary teeth apt to be hypoplastic in a child born to an osteomalacic mother?

A. "We conclude that as we found nearly perfect teeth in children and women with severe rickets and osteomalacia the calcification of the bones of the body are not necessarily directly connected with the same process in the teeth."

R. Taylor, G. F., and Day, C. D. M. Osteomalacia and dental caries. Brit. Med. J., 2:221-2, Aug. 17, 1940. (p. 221) J.A.

9. Q. Is there a gingivitis of pregnancy?

A. "Pregnancy gingivitis (by us termed 'hormonal gingivitis') was found in most of the pregnant women examined and the significant change in these gums was hyperplasia of the Epithelium with progressive loss of the keratin layer as pregnancy advanced from the fourth to the ninth month."

R. Ziskin, D. E. The effect of hormonal treatment on the gums and oral mucosa of women. J. Dent. Res., 16:367-78, Oct. 1937. (p. 367) R.D.A.

10. Q. Does pregnancy destroy alveolar bone?

A. "Intraoral x-rays of pregnant women do not support the thesis that bone destruction is common during pregnancy. As a matter of fact, the literature does not contain any evidence that alveolar destruction is more common during pregnancy than at other times."

R. Schour, Isaac. Calcium metabolism, pregnancy and caries. Chicago Dent. Soc. Fortn. Rev., 3:11-2, Feb. 1, 1943. (p. 11-2) R. D. A.

11. Q. Is Vincent's disease more prevalent during pregnancy?

A. "In my clinical experience, I have never noticed any correlation between Vincent's infection and pregnancy. In fact, to my immediate recollection, I have never seen Vincent's in a pregnant woman."

R. Hard, D. G. Personal communication. May 8, 1944. R.D.A.

12. Q. Does pregnancy produce an acid saliva?

A. "From the foregoing we conclude; (1) that pregnancy, per se, is not a cause of dental caries, (2) that while the saliva is slightly more acid during pregnancy, the degree of acidity is not sufficient to produce tooth decay—."

13. Q. What causes cleft palate?

A. "There is much speculation, but very little definite knowledge regarding the etiology of cleft lip and of cleft palate.

"Heredity.—This is a well-known predisposing factor, a large precent-

age of cases give a history of similar defects in other members of the family . . .

"Maternal Impressions. — The influence of maternal impressions as a cause of congenital deformities must be regarded as a superstition without foundation . . .

"Defective Nutrition. — Defective nutrition or general weakness during pregnancy may be a factor in delaying union . . .

"The Mechanical Theory.—Brophy favored the theory of pressure of the tongue on the palate due to the flexed position of the head, and pressure of the mandible against the sternum as factors in preventing union.

"Supernumerary Teeth. — Warnekros, studying the teeth of cleft palate children, concludes that supernumerary teeth may be the causes. It would seem more likely that the factors which produced the cleft palate should be regarded as the cause of supernumerary teeth, rather than the teeth a cause of the cleft . . .

"It is not uncommon to find other deformities in connection with cleft lip and palate."

R. Vaughan, H. S. Congenital cleft lip and cleft palate and associated nasal deformities. Philadelphia, Lea and Febiger, 1940. 210 p. (P 35-6) D.R.B.

14. Q. With a calcium shortage in the pregnant mother, are her long bones apt to suffer dangerous resorption when the fetus becomes parasitic upon her calcium reserves?

A. "The calcium needs of the mother are increased during pregnancy. The fetus is a parasite which lives upon the mother and obtains its nourishment directly through the blood stream, regardless of whether its dietary elements are ingested by the mother or taken from the mother's tissues. However, the total amount needed by the fetus is relatively small in relation to the total body calcium of the mother.

"The full term infant weighing 3,000 grams contains approximately 24 grams of calcium. The average woman has 2,000 to 2,500 grams of calcium of which 97-98 per cent is within the bones and less than 1 per cent in the teeth. The total calcium need of the fetus is therefore 1 per cent of the mother's storehouse. Such a drain is not serious . . . There is no reason to believe that, except under severe dietary restrictions, the fetal calcium needs must be obtained from the maternal reserves in the skeleton."

R. Schour, Isaac. Calcium metabolism, pregnancy and caries. Northwest. Den., 21:97-8, Apr. 1942. (p. 97) D.R.B.

15. Q. With a calcium shortage in the pregnant mother, is her enamel apt to suffer resorption?

A. No.

"Since the bone acts as a storehouse of calcium to be drawn upon when the need arises in the organism, many men have placed the teeth in the same category, forgetting that while the bone is a vital structure, both enamel and dentine are avascular and acellular . . . The fundamental differences between bone and teeth are completely disregarded in the concept that calcium withdrawal is possible from the teeth. There is no evidence to support this assumption nor any scientific mechanism to explain it."

R. Schour, Isaac. Calcium metabolism, pregnancy and caries. North-West Den., 21:97-8, Apr. 1942. (p. 97) W.S.C.

16. Q. With a calcium shortage in the pregnant mother, is her dentine apt to suffer resorption?

A. No. Refer to answer of number 15.

R. Same as number 25. W.S.C.

FROM OUR UNITS

Missouri:

On June 9th the Missouri Unit held its annual meeting for the election of officers to serve for the coming year. The following were elected:

Dr. J. C. Gordon ..... President
Dr. Florence Rich ..... Pres.-Elect.
Dr. J. E. Rook ..... Secretary-Treasurer
Dr. J. M. Jolly ..... Members of Council to serve 3 years

The meeting was preceded by a Barbecue Supper attended by members, their wives, and prospective members, and despite the threatening clouds, proved very delighful. Five new members were added to the roster.

At the meeting it was decided to continue the course of the preceding year and hold 3 meetings this coming year—2 scientific and one business for the election of officers.

The November meeting at which Dr. J. C. Gordon discussed "Socialized Dentistry" was a very provocative one. The essaying was very well informed and the resulting discussion brought out the result of the intense research he has done on the subject.

Our April meeting essayist was Dr. Zonja W. Lawrence, bio-chemist and Instructor in Diet at Washington University, who spoke on "Nutrition and Its Effect on Growth and Development." It was a very interesting paper and presented the subject both from the experimental and practical points of view.

At the May meeting of the St. Louis Dental Society a number of clinics were presented by the members of our Organization.

Both the retiring President, Dr. Cornelia Thompson, and the Chairman of the Program Committee, Dr. Ruth Martin, are to be congratulated for a very successful year. Dr. Ford, Chairman of the Membership Committee, is to be commended for his untiring and zealous efforts in bringing in new members.

Florence Rich, Sec'y, and Treas.

Pennsylvania:

Our Quaker Unit has presented varied and interesting programs to its members the past year, and for the information of the other units who might care to know how we keep our members in attendance, I am submitting a list of our speakers:

November 20, 1944. Speaker: Dr. Louis Grossman, Assistant in Oral Medicine and Head of Root Therapy at the University of Pennsylvania.

Subject: Treatment of Pulp Involved and Pulpless Teeth in Children.

January 15, 1945. Speaker: Dr. Elizabeth Kassab, Department of Children's Dentistry, University of Pennsylvania.

Subject: Dental Caries in Children.

March 19, 1945. Speaker: Elizabeth Kirk Rose, M.D.

Subject: The Philadelphia Mass Nutrition Study.

April 16, 1945. Speaker: Austin A. Dodge, Assistant Professor of Pharmacy, Philadelphia College of Pharmacy and Science; Editor, American Journal of Pharmacy.

Subject: Dental Drugs and Therapeutics.

Gertrude Tank, Sec'y. and Treas.